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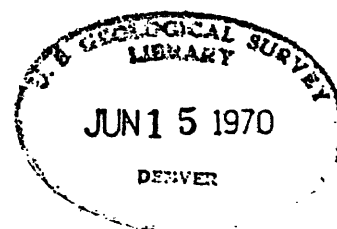
UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Selected Stratigraphic Sections from the  
Gallup Area, New Mexico

By

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Open-file report

1970

**90-314**

This report is preliminary and has not been edited or reviewed for conformity with U.S. Geological Survey standards and nomenclature.

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Section A.--Ft. Wingate, McKinley County, N. Mex.

[Measured by J. H. Stewart and R. F. Wilson starting at point about 1/2 mile N. 20° W. of Navajo sheep laboratory and continuing for about 1-1/2 miles north-northeast to promontory on line of cliffs in northernmost part of Ft. Wingate ordinance depot, section about 1-1/2 miles west of town of Ft. Wingate, Long. 108°33'35" to 108°34'15" W., Lat. 35°27'40" to 35°28'55" N.

Feet

Top of section; top of exposure. Top of section is about 1 mile N. 50° W. from water tower at Ft. Wingate and about 1 mile N. 17° E. from Navajo Sheep laboratory-----

Chinle Formation (incomplete):

Petrified Forest member (incomplete):

Sonsela sandstone bed (incomplete):

18. Sandstone, same as unit 16. Sandstone commonly contains gray and green claystone and siltstone pellets. A few thin sets contain a few (5 percent) gray chert granules and pebbles as large as 1 in. in maximum diameter. Basal 4 ft. of unit is composed of greenish-gray, fine-grained well cemented sandstone that is dominantly horizontally laminated but contains some very low-angle cross laminae. Unit weathers to form vertical cliff and underlies mesa-----

56+

Section A.--Ft. Wingate, McKinley County, N. Mex.--Continued

Chinle Formation (incomplete)--Continued

Petrified Forest member (incomplete)--Continued

Sonsela sandstone bed (incomplete)--Continued

Feet

15. Silty claystone to sandy siltstone (80 percent) and sandstone (20 percent). Silty claystone to sandy siltstone, light-greenish-gray (5GY 8/1), medium-gray (N5), and grayish-purple (5P 4/2), weathers same colors, sand fraction is very fine-grained; firmly indurated, clay binding, noncalcareous; stratification concealed. Sandstone, light-greenish-gray (5GY 8/1) to greenish-gray (5GY 6/1), weathers same colors fine-grained; well sorted; composed of subangular clear quartz and rare orange accessory minerals; well indurated, noncalcareous; horizontally laminated, some wavy laminae, rare small- to medium-scale low-angle cross laminae. Unit as a whole weathers to form slope. Sandstone is present as set from 5.6-7.0 ft. and forms ledge----- 12.4

Section A.--Ft. Wingate, McKinley County, N. Mex.--Continued

Chinle Formation (incomplete)--Continued

Petrified Forest member (incomplete)--Continued

Sonsela sandstone bed (incomplete)--Continued

Feet

14. Sandstone, light-greenish-gray (5GY 8/1), weathers same color; medium- to coarse-grained, some very coarse grains and granules, abundant interstitial clay; poorly sorted; composed of subangular clear and milky quartz, 5 percent orange mineral; poorly indurated, clay binding and calcareous cement; stratification concealed; weathers to form slope. Possibly a few chert granules-----	<u>12.0</u>
Total of incomplete Sonsela sandstone bed-----	<u><u>88.3</u></u>

Petrified Forest member (lower part):

13. Silty claystone, grayish-purple (5P 4/2) with light-greenish-gray (5GY 8/1) mottling, common very-light-gray (N8), weathers same color; swelling clays; firmly to well indurated, noncalcareous clay binding; structureless; weathers to form steep frothy surfaced slope. Contains several limestone nodule horizons. Unit is light-greenish-gray (5GY 8/1) and yellowish-gray (5Y 8/1) in top 5 ft.- 95.0

Section A.--Ft. Wingate, McKinley County, N. Mex.--Continued

Chinle Formation (incomplete)--Continued:

Petrified Forest member (lower part)--Continued:

Feet

12. Sandy siltstone (10 percent) to silty sandstone (10 percent), pale-red-purple (5RP 6/2) and light-greenish gray (5GY 8/1), colors mottled; grades from silt with minor very fine- to fine-grains to silty, fine-grained sandstone; poorly to fair sorted; sand fraction composed of sub-angular milky quartz(?), 10 percent orange grains, and 3 percent coarse-grained dark-green mica; well-indurated, noncalcareous clay binding; horizontally laminated, minor very low-angle large-scale cross laminae, much of stratification concealed; weathers to form steep slope. Unit forms conspicuous white band along local and distant exposures. Base of unit marks prominent change from reddish rocks below to purplish rocks above-----40.0

Section A.--Ft. Wingate, McKinley County, N. Mex.--Continued

Chinle Formation (incomplete)--Continued:

Petrified Forest member (lower part)--Continued:

- |   | <u>Feet</u> |
|---|-------------|
| 11. Silty claystone, moderate-red ( <u>5R</u> 5/4), pale-reddish-brown ( <u>10R</u> 5/4), and grayish-red ( <u>5R</u> 4/2), weathering moderate-red ( <u>5R</u> 5/4), contains some clayey siltstone; firmly to well indurated, noncalcareous, clay binding; structureless; weathers to form frothy surface slope. Probably bentonitic although claystone does not swell noticeably on contact with water. Units 11 to 18 measured about 1 mile N. 50° W., of water tower at Ft. Wingate----- | 89.0        |
| 10. Siltstone to silty sandstone, pale-red ( <u>5R</u> 6/2) and light-greenish-gray ( <u>5GY</u> 8/1) in top 1.5 ft., weathers same colors, grades from coarse siltstone to silty, very fine-grained sandstone, common medium- to fine-grained accessory white mica; well cemented, calcareous; ripple laminated in top 1.5 ft., possibly some small-scale low-angle cross strata; weathers to form small ledge at base of prominent cliff-----   | 6.0         |

Section A.--Ft. Wingate, McKinley County, N. Mex.--Continued

Chinle Formation (incomplete)--Continued:

Petrified Forest member (lower part)--Continued:

	<u>Feet</u>
9. Claystone, grayish-red (5R 4/2), grayish-red-purple (5RP 4/2), some light-greenish-gray (5GY 6/1) mottling, weathers some and pale-red (5R 6/2); probably swelling clays; firmly indurated, noncalcareous clay binding; structureless; weathers to form slope-----	13.0
8. Covered, forms 1,000 ft. wide flat-----	100.0
Total of lower part of Petrified Forest member-----	<u>343.0</u>
Total of Petrified Forest member (composite of sections A and B)-----	<u>1,337.2</u>



Section A.--Ft. Wingate, McKinley County, N. Mex.--Continued

Chinle Formation (incomplete)--Continued:

Lower red

Feet

member:

^

7. Sandstone (70 percent) and limestone pebble conglomerate (30 percent). Sandstone very-light-gray (N8), white (W9), and pinkish-gray (5YR 8/1), weathers pinkish-gray (5YR 8/1), very fine- to fine-grained; well sorted; composed of subrounded clear quartz and common black and rare green accessory minerals, rare medium-grained accessory white mica; firmly to well cemented, calcareous; composed of thin shallow trough and tabular planar sets of small- to medium-scale, low-angle cross laminae, ripple laminated in top 3 ft. of unit. Limestone pebble conglomerate, very-light-gray (N8), weathers moderate-yellowish-brown (10YR 5/4), composed of subrounded coarse grains to pebbles of grayish limestone and possibly siltstone in a fine-grained matrix the same as the sandstone part of the unit, pebbles are commonly as large as 1 in. in maximum diameter; well cemented, calcareous; present as thin to thick structureless lenses interstratified with and interfingering irregularly with the sandstone part of unit.

Section A.--Ft. Wingate, McKinley County, N. Mex.--Continued

Chinle Formation (incomplete) -Continued:

Lower red

A member--Continued:

Feet

Limestone pebble conglomerate confined to lower half of unit. Unit as whole weathers to form ledge. Unit highly variable in lithology and thickness along exposure. Locally entire unit is limestone pebble conglomerate. To east of line of section, another sandstone is present about 20 ft. above this one and the higher sandstone appears to coalesce westward and form a part of this unit at the section----- 22.0

Section A.--Ft. Wingate, McKinley County, N. Mex.--Continued

Chinle Formation (incomplete)--Continued:

Lower red

^ member--Continued:

Feet

6. Claystone, grayish-purple (5P 4/2), grayish-red-purple (5RP 4/2), and rare greenish-gray (5G1 6/1) in basal 50.4 ft., dark-reddish-brown (10R 3/4) in top 40.2 ft., weathering same colors; silty in parts, swelling clays; firmly indurated; calcareous in parts; structureless, a few horizontal stratification planes; weathers to form frothy surfaced slope. Section offset on top of this unit so that overlying units measured about 1,000 ft. north of this unit----- 90.6

5. Covered, forms 1,000 ft. wide flat----- 112.0

lower red

Total of member----- 224.6

^

Section A.--Ft. Wingate, McKinley County, N. Mex.--Continued

Chinle Formation (incomplete)--Continued:

Shinarump member(?):

Feet

4. Sandstone (70 percent) to conglomerate (30 percent), pale-yellowish-brown (10YR 6/2) and very-light-gray (N3), weathering very-pale-orange (10YR 8/2), sandstone is very fine-grained, well sorted, and composed of subrounded clear quartz. Conglomerate is composed of white and orange granules and pebbles of quartz averaging about 1/4 to 1/2 in. maximum diameter and of white or yellowish gray granules and pebbles of siltstone or possibly dolomite. Granules and pebbles are in a very fine to fine-grained matrix.

Sandstone to conglomerate is well cemented, calcareous; composed of thin trough sets of low-angle, medium-scale cross laminae in lower half and ripple laminae in upper half; weathers to form ledge. Thickness is maximum for local area. Conglomerate is present as thin to thick lenses interstratified with and interfingering irregularly with the sandstone.

Basal contact is erosion surface with scours

as much as 3 ft. deep----- 17.0

Total of Shinarump member(?)----- 17.0

Section A.--Ft. Wingate, McKinley County, N. Mex.--Continued

Chinle Formation (incomplete)--Continued:

Feet

Mottled strata:

3. Silty sandstone, mottled light greenish-gray.

(5GY 8/1), grayish-purple (5P 4/2), pale-red-purple (5RP 6/2), and grayish-red (5R 4/2), rare dark-yellowish-orange (10YR 6/6), weathering same colors; silty, very fine to fine-grained, about 10-20 percent of rock is medium grains to pebbles as large as 1/2 in. in maximum diameter, poorly sorted; composition of very fine to fine grains masked, medium to coarse grains are subangular clear and minor orange quartz, granules and pebbles are subrounded clear and orange quartz; well indurated, possibly siliceous cement, noncalcareous; structureless; weathers to form hackly-surfaced ledge and forms tops of low mesas or hills in local area. Section transferred on top of this unit so that overlying units measure 2,000 ft. north, down creek from

where unit 3 and underlying units measured-----	<u>12<sup>+</sup></u>
Total of mottled strata-----	<u>12<sup>+</sup></u>
Total of Chinle Formation (composite of	
sections A and B)-----	<u>1,619.0</u>

Section A.--Ft. Wingate, McKinley County, N. Mex.---Continued

Feet

Moenkopi Formation(?)

2. Siltstone (40 percent) and sandstone (60 percent).

Siltstone, grayish-red (10R 4/2), weathers same color, medium to coarse silt, sandy in parts, very fine grained, rare very fine grained accessory white mica; firmly indurated, noncalcareous clay binding; stratification concealed; platy splitting suggesting that rock is horizontally laminated.

Silty sandstone, pale-red (5R 6/2), rare dark-reddish-brown (10R 3/4), weathering pale-reddish-brown (10R 5/4), silty, very fine to fine-grained, fair to well sorted; composition masked, grains are dark gray or reddish; well indurated, non-calcareous; stratification mostly concealed, some horizontal(?) laminae, possibly a few low-angle cross laminae. Sandstone is present as thin to thick sets interstratified with the siltstone.

Top 5 ft. of unit is dominantly dark-reddish brown (10R 3/4) and contains mottling of very light-gray (N8) and pale-red-purple (5RP 6/2). Possibly some of the mottled rock belongs in overlying unit.

Contact with overlying unit placed at change from dominantly brownish rock below a dominantly mottled purple, white, and brown rock above, and also at change from sandstone below to

Section A.--Ft. Wingate, McKinley County, N. Mex.--Continued

Moenkopi Formation(?)--Continued

	<u>Feet</u>
sandstone above containing a few scattered granules of quartz. In addition, overlying unit forms a fairly well defined ledge-----	<u>36.3</u>
Total of Moenkopi Formation(?)-----	<u><u>36.3</u></u>

Section A.--Ft. Wingate, McKinley County, N. Mex.--Continued

Feet

San Andres formation:

Limestone member:

1. Dolomite and possibly some limestone, yellowish-gray  
(5Y 8/1), weathering same color, dense, possibly some  
silt-sized crystals; well-cemented; structureless,  
some suggestion of horizontal stratification planes;  
weathers to form ledge. About 12 ft. exposed----- Unmeasured

Base of section; base of exposure. Base of section  
about 1/2 mile, N. 20° W. of Navajo Sheep  
laboratory on east side of creek that passes  
directly west of the laboratory.



Section B.--Ft. Wingate, McKinley County, N. Mex.

Measured by J. H. Stewart and R. F. Wilson in westernmost part of

Ft. Wingate and entrance depot about 3-1/2 to 4-1/2 miles west of town

of Ft. Wingate, units 1-11 measured from Long.  $108^{\circ}35'50''$  to  $108^{\circ}36'40''$

W., and Lat.  $35^{\circ}28'05''$  N., and units 12-22 measured from Long.

$108^{\circ}36'50''$  to  $108^{\circ}37'30''$  W. and Lat.  $35^{\circ}28'50''$  N.

Feet

Top of section; not top of exposure-----

Entrada sandstone (incomplete):

Upper sandy member (unmeasured):

22. Sandstone, light brown (5YR 6/4), weathering same color, very fine grained, well sorted; composed of subrounded reddish stained quartz and abundant black accessory mineral; firmly to poorly cemented, calcareous; composed of thin to very thick wedge planar sets of low-angle medium-to large-scale cross laminae, common sets from 1-30 ft. thick of horizontally laminated sandstone interstratified with rest of unit; weathers to form smooth bare rock slope and ledges. Basal foot of unit is white

(N9)----- Unmeasured

Section B.--Ft. Wingate, McKinley County, N. Mex.---Continued

Entrada sandstone (incomplete) --Continued:

Feet

Medial silty member:

21. Sandstone and minor sandy siltstone, light-brown

(5YR 6/4) and pale-reddish-brown (10R 5/4),

weathering pale-reddish-brown (10R 5/4), very

fine-grained sand, well sorted; composed of

subrounded reddish stained quartz and 5 percent

black mineral; firmly to well cemented, calcareous;

structureless, stratification concealed in some

places; weathers to form earthy slope. Contains

two thin beds of white (N9) fine-grained sandstone

in basal half----- 38.4

Total of Medial silty member----- 38.4

Total of incomplete Entrada sandstone----- 38.4

Section B.--Ft. Wingate, McKinley County, N. Mex.--Continued

Feet

Wingate sandstone:

Lukachukai member:

20. Sandstone, light-brown (5YR 6/4), weathering same color; fine-grained, rare disseminated medium to coarse grains, fair to well sorted; composed of subrounded reddish stained quartz and abundant black and white accessory minerals; poorly cemented, calcareous; composed of thin to very thick wedge and tabular planar sets of medium-to large-scale high-angle cross laminae, common (20 percent) horizontally laminated or structureless parts; weathers to form vertical cliff in basal 50 ft. and rough gentle slope in rest of unit. One lamina was noted that was 30 percent very coarse grains to small granules of gray and milky quartz and rare white chert. Basal foot of unit is white (N9). Unit from 139.4 to 144.4 ft. is siltstone. Siltstone, grayish-red (10R 4/2), weathering same color; fine silt, abundant very fine-grained mica; poorly cemented, slightly calcareous; stratification concealed, platy splitting. Parts of unit poorly exposed-----

158.4

Total of Lukachukai member-----

158.4

Section B.--Ft. Wingate, McKinley County, N. Mex.--Continued

Feet

Wingate sandstone--Continued

Rock Point member:

19. Siltstone, pale-reddish-brown (10R 5/4) and light-brown (5YR 6/4), weathering same colors, medium silt; poorly to firmly cemented, calcareous; structureless; a few horizontal stratification planes; weathers to form slope----- 30.8
- Total of Rock Point member----- 30.8
- Total of Wingate sandstone----- 189.92

Chinle Formation:

Owl Rock member:

18. Siltstone (50 percent) and silty limestone (50 percent). Siltstone, pale-reddish-brown (10R 5/4), weathering same color; fine silt; firmly cemented, calcareous; stratification concealed. Silty limestone, pale-reddish-brown (10R 5/4), and minor pale-red-purple (5RP 6/2), weathering same colors; dense; well cemented; stratification concealed; silty limestone grades to siltstone. Siltstone contains abundant limestone nodules in places. Unit marks top of purplish-appearing rocks----- 14.4
17. Limestone, grayish-red (5RP 4/2) and minor light-greenish-gray (5GY 8/1), weathering light-gray (N 7), dense; well cemented; unit is a thick horizontal bed; weathers to form ledge. Ledge is most prominent ledge in upper part of Chinle Formation----- 3.0

Section B.--Ft. Wingate, McKinley County, N. Mex.--Continued

Chinle Formation--Continued:

Owl Rock Member--Continued:

Feet

16. Siltstone, pale-reddish-brown (1OR 5/4) and pale-red-purple (5RP 6/2) in top foot, weathering same colors, fine to medium silt; firmly cemented calcareous; structureless, weathers to form slope----- 9.5
15. Limestone, grayish-red-purple (5RP 4/2), weathering same color, dense; well cemented; unit is horizontal bed; weathers to form knobby ledge. Unit does not appear to extend more than 100 ft. away from line of section----- 1.3
- Total of Owl Rock Member----- 28.2

Section B.--Ft. Wingate, McKinley County, N. Mex.--Continued

Chinle Formation--Continued:

Feet

Petrified Forest Member (upper part):

14. Clayey siltstone, pale-reddish-brown (10R 5/4),  
light-brown (10YR 6/4), rare brownish-gray  
(5YR 4/1) and moderate yellowish-brown (10YR 5/4)  
weathering same colors; fine to medium silt,  
clayey, some silty claystone, probably non-  
bentonitic; firmly cemented, noncalcareous;  
structureless; weathers to form slope covered  
by thin loose veneer of debris. This unit  
might contain some bentonitic rocks but base of  
unit changes from largely bentonitic rocks below  
to largely non-bentonitic rocks above. When  
viewed from a distance, unit weathers from smooth  
surface instead of frothy surface of underlying  
unit. Locally away from line of section about  
top 40 ft. of unit contains a few thin silty  
limestone beds----- 110.0

Section B.--Ft. Wingate, McKinley County, N. Mex.--Continued

Chinle Formation--Continued:

Petrified Forest Member (upper part)--Continued:

Feet

13. Claystone (40 percent), siltstone (43 percent)  
and minor silty and clayey sandstone (17 percent),  
pale-reddish-brown (10R 5/4), moderate-red  
(5R 5/4), grayish-red (5R 4/2), pale-red  
(10R 6/2), and rare light-greenish-gray (5GY  
8/1) bands; swelling clays; firmly indurated,  
clay binding, noncalcareous; structureless,  
indistinct horizontal beds in some parts, possibly  
a few low angle cross-strata. Silty and clayey  
sandstone is very fine grained and the composition  
is masked. Purplish colors are most conspicuous  
in basal 30-40 ft. of unit. Top half of unit  
probably contains more siltstone than bottom  
half. These siltstones do not appear to contain  
swelling clays----- 430.0

Section B.--Ft. Wingate, McKinley County, N. Mex.--Continued

Chinle Formation--Continued:

Petrified Forest Member (upper part)--Continued

Feet

Perea sandstone bed:

12. Sandstone, yellowish-gray (5Y 8/1), light-greenish-gray (5GY 8/1), and light-olive-gray (5Y 6/1), weathering same colors; very fine- to fine-grained, fair-sorted; composed of subangular clear quartz, accessory minerals masked; well cemented, calcareous; horizontally laminated and thin trough and tabular planar sets of low angle, small-to medium-scale cross laminae; weathers to form hogback. Hogback is about as prominent as that developed on the Sonsela sandstone bed. Unit contains abundant siltstone pellets in some places. Unit is highly variable in thickness along exposure and locally sandstone is split into two ledges separated by a siltstone or claystone interval. Unit measured at place S. 45° E. of water tower on Ft. Wingate ordinance depot----- 23<sup>+</sup><sub>2</sub>
- Total of Perea sandstone bed----- 23<sup>+</sup><sub>2</sub>

Offset at base of unit 12 so that unit 12 and overlying units are measured about 3/4 mile north of underlying units. Possibly as much as 10 or 20 ft. of section lost or gained in offset



Section B.--Ft. Wingate, McKinley County, N. Mex.--Continued

Chinle Formation--Continued:

Petrified Forest Member (upper part)--Continued:

- |  | <u>Feet</u> |
|--|-------------|
| 11. Clayey siltstone to clayey sandstone, light-greenish-gray ( <u>5GY</u> 8/1), weathering same color; grades from clayey siltstone to very fine-grained, clayey sandstone, some fine-to coarse-grains, common accessory white and dark mica; stratification concealed; weathers to form slope-----   | 16.8        |
| 10. Sandstone, light-brownish-gray ( <u>5YR</u> 6/1) and light-olive-gray ( <u>5Y</u> 6/1), weathering same colors; fine-grained, well sorted; composed of subrounded to subangular clear quartz and abundant black and orange accessory minerals; firmly cemented, calcareous; horizontally laminated, some shallow, thin trough sets and tabular planar sets of low-angle small-scale cross-laminae; weathers to form ledge. Unit is a lens extending for about 1,000 ft. along the outcrop. Contains some siltstone pellets. One bone fragment noted----- | 11.2        |

Section B.--Ft. Wingate, McKinley County, N. Mex.---Continued

Chinle Formation--Continued:

Petrified Forest Member (upper part)--Continued:

	<u>Feet</u>
9. Claystone to clayey siltstone, pale-reddish-brown (1CR 5/4), moderate red (5R 5/4), and grayish-red (5R 4/2), minor grayish-red-purple (5RP 4/2) in basal 30 ft., weathering some colors; swelling clays; firmly indurated, clay binding, calcareous; mostly structureless, a few horizontal bedding planes and very thin to thin beds; weathers to form frothy surfaced badlands. Contains several thin to very thick lenses of clayey and silty sandstone in basal half. These sandstones range from very fine- to medium-grained-----	221.6
8. Siltstone to silty sandstone, grayish-red (5R 4/2) and grayish-red-purple (5RP 4/2), weathering same colors; nonswelling clays, horizontally very thin to thick bedded in upper part, low angle inclined laminae in lower part (slump?, cross-strata?); weathers to form slope-----	<u>22.4</u>
Total of upper part of Petrified Forest member-	<u><u>835.0</u></u>

Section B.--Ft. Wingate, McKinley County, N. Mex.--Continued

Chinle Formation--Continued:

Petrified Forest Member (upper part)--Continued:

Sonsela sandstone bed:

Feet

7. Sandstone, light-olive-gray (5Y 6/1), light-gray (5Y 8/1), and light-greenish-gray (5GY 8/1), weathering same colors; fine- to medium-grained, fair- to poorly-sorted; composed of subrounded to subangular clear and milky quartz, 5 percent black grains and 2 percent orange grains; poorly cemented, calcareous; composed of thin to thick trough sets of medium-scale, low-angle cross-laminae; weathers to form ledge and basal part of dip slope developed in upper part of Sonsela sandstone bed. Contains a thin bed of conglomerate at base. Conglomerate contains pebbles of black, and gray chert and rare white quartz. Pebbles are as large as 1-1/2 in. in maximum diameter. A few scattered granules and pebbles are present in rest of unit----- 26+

Section B.--Ft. Wingate, McKinley County, N Mex.--Continued

Chinle Formation--Continued:

Petrified Forest Member (upper part)--Continued:

Sonsela sandstone bed--Continued

Feet

6. Silty and clayey sandstone (90 percent) and silty claystone (10 percent). Silty and clayey sandstone, light-greenish-gray (5GY 8/1) and greenish-gray (5GY 6/1), weathering same colors; fine- to medium-grained, rare coarse grains, poorly sorted; composed of subangular to angular clear and milky quartz and abundant orange and green accessory minerals, common dark-green accessory mica; poorly indurated, clay binding; horizontally laminated to thin bedded. Silty claystone, similar to claystone in unit 3. Unit as whole weathers to form slope----- 11.6
5. Mostly covered, probably mostly reddish-claystone and siltstone----- 16.4
4. Sandstone to conglomerate, yellowish-gray (5Y 8/1), weathering same color; fine- to medium-grained, fair-sorted; composed to subangular clear and milky quartz and 2-5 percent black and red accessory minerals; firmly to well cemented, noncalcareous; composed of thin to thick trough sets of low-angle, medium-scale cross-laminae; weathers to form a ledge and part of dip slope on hogback developed on Sonsela sandstone bed. Conglomerate to conglomeratic sandstone constitutes about 10-20 percent

Section B.--Ft. Wingate, McKinley County, N. Mex.--Continued

Chinle Formation--Continued:

Petrified Forest Member (upper part)--Continued:

Sonsela sandstone bed--Continued:

of the unit and is composed of gray, red, and  
black chert and minor white quartz pebbles in a  
fine- to medium-grained sand matrix. Pebbles  
are as large as 2 in. in maximum diameter. Unit  
is highly variable in thickness and in content  
of conglomerate-----

Feet

5±

Section B.--Ft. Wingate, McKinley County, N. Mex.--Continued

Chinle Formation--Continued:

Petrified Forest Member (upper part)--Continued:

Sonsela sandstone bed--Continued:

Feet

3. Claystone (80 percent) and clayey sandstone  
(20 percent). Claystone, grayish-red-purple  
(5RP 4/2), weathering same color; swelling  
clays; poorly indurated, slightly calcareous;  
stratification concealed. Clayey sandstone,  
light-brownish-gray (5YR 6/1) and light-greenish-  
gray (5GY 8/1), weathering same colors, very fine to  
fine-grained, fair-sorted; composed of subangular  
clear quartz and 5 percent black and green  
accessory mineral; poorly cemented, clay binding;  
stratification concealed. Unit as whole weathers  
to form slope----- 17.0
2. Sandstone, same as unit 14, Ft. Wingate section A.  
In basal 20 ft., unit contains a few thin lenses  
containing a few scattered granules and pebbles.  
Granules and pebbles are as large as 1 in. in  
maximum diameter, and are composed of gray, and  
minor red, chert. Basal contact of unit covered.  
Unit poorly exposed in upper part. Thickness of  
unit may be slightly in error because of long  
hand level sights across dip slopes----- 83.2
- Total of Sonsela sandstone bed----- 159.2

Section B.--Ft. Wingate, McKinley County, N. Mex.--Continued

Chinle Formation--Continued:

Petrified Forest Member (lower part) (unmeasured):                      Feet

1. Silty claystone, same as unit 13, Ft. Wingate

section A----- Unmeasured

Base of section: not base of exposure. Base of section is about 2 miles E.  $65^{\circ}$  W. of Navajo Sheep Laboratory, about 2 miles N.  $65^{\circ}$  W. of Ft. Wingate, and about 1-1/2 miles S.  $71^{\circ}$  W. of top of Ft. Wingate section A. Units 1 to 11 measured across a 1-mile-long area along a S.  $75^{\circ}$  W. line.

Section A.--Chavez-Prewitt, McKinley County, N. Mex.

[Measured by J. H. Stewart and R. F. Wilson about 3 miles east of Bluewater Reservoir; units 1 and 2 measured on north side of a small canyon in the east-central part of sec. 36, T. 13 N., R. 12 W., units 3-16 measured along a north line starting in wash and ending on a prominent point along cliffs north of Bluewater Canyon, central and north-central part of sec. 36, T. 13 N., R. 12 W.

Top of section; top of exposure. Top of section S. 25° W. of oil refinery, N. 53° W. of Anaconda uranium mill, and N. 72° E. of Syran.

Feet

Chinle Formation (incomplete):

Petrified Forest member (incomplete):

Sonsela sandstone bed (incomplete):

- |  |     |
|--|-----|
| 16. Sandstone to conglomerate, same as unit 14,<br>weathers to form small knoll. Most, if not<br>all, of the Sonsela sandstone bed is probably<br>exposed in this section----- | 5.6 |
| 15. Silty claystone, same as unit 11, weathers to<br>form gentle slope-----  | 8.2 |



Section A.--Chavez-Prewitt, McKinley County, N. Mex.--Continued

Chinle Formation (incomplete)--Continued:

Petrified Forest member (incomplete)--Continued:

Sonsela sandstone bed (incomplete)--Continued:

Feet

14. Sandstone to conglomerate, very-pale-orange

(10YR 8/2) and yellowish-gray (5Y 8/1), weathers same color, fine- to medium-grained, rare coarse-grained parts, fair sorted; composed of subangular clear quartz and rare black accessory minerals; poorly to firmly cemented, slightly calcareous in parts; composed of thin to thick trough sets of low-angle small- to medium-scale cross laminae; weathers to form vertical cliff and underlies part of dip slope developed on Sonsela sandstone bed. About 45 percent of unit contains granules to pebbles. In places the rock contains only a few scattered granules and pebbles whereas in other places the rock is a conglomerate. Granules to pebbles are composed of chert, quartzite, and minor quartz. They are mostly 1/4-1/2 in. in maximum diameter but are as large as 2-1/2 in.

in maximum diameter----- 70.2

Total of Sonsela sandstone bed (incomplete)----- 84.0

Section A.--Chavez-Prowitt, McKinley County, N. Mex.--Continued

Chinle Formation--Continued:

Feet

Petrified Forest member (lower part):

13. Covered, weathers to form rubble-covered slope----- 22.4
12. Very poorly exposed. Some exposures indicate unit  
grades from claystone to siltstone; light-greenish-  
gray (5GY 8/1), greenish-gray (5GY 6/1), and minor  
grayish-red (10R 4/2), swelling clays in places;  
stratification concealed; weathers to form  
rubble-covered slope. Top of unit placed at  
highest exposure----- 24.4
11. Silty claystone, grayish-purple (5P 4/2) and  
abundant light-greenish-gray (5GY 8/1) mottling,  
5 ft. interval of grayish-red (5R 4/2) about 10 ft.  
below top, weathers same colors; swelling clays;  
firmly indurated, noncalcareous; structureless;  
weathers to form steep "frothy" surfaced slope---- 53.5

Section A.--Chavez-Prewitt, McKinley County, N. Mex.--Continued

Chinle Formation--Continued:

Petrified Forest member (lower part):

	<u>Feet</u>
10. Siltstone, grayish-red (10R 4/2), some grayish-red (5R 4/2) and light-greenish-gray (5GY 8/1) mottling in top 10 ft., weathers same colors and pale-reddish-brown (10R 5/4), fine silt, minor medium to coarse silt, very-fine-grained accessory white mica common in parts; firmly to well cemented, calcareous; horizontally thinly laminated to laminated, uncommon (10 percent) thin sets of ripple laminae, top 15 ft. are structureless; weathers to form steep slope. Basal 6± ft. of unit on either side of section is a prominent ledge-forming siltstone. This siltstone is mottled light-greenish-gray (5GY 8/1) and grayish-red (5R 4/2), weathers grayish-red (10R 4/2); composed of coarse silt; contains common very-fine- to fine-grained accessory white mica; is well cemented with a calcareous cement; ripple laminated-----	38.9

Section A.--Chavez-Prewitt, McKinley County, N. Mex.--Continued

Chinle Formation--Continued:

Petrified Forest member (lower part):

Feet

9. Silty claystone and minor clayey siltstone,  
grayish-red (5R 4/2 and rare 10R 4/2),  
weathers same color; swelling clays; firmly  
indurated, noncalcareous, clay binding; papery  
and platy splitting, splitting suggests that  
unit is horizontal<sup>ly</sup> laminated to thinly  
laminated; weathers to form steep frothy  
surfaced slope----- 14.0
8. Clayey siltstone, light-greenish-gray (5GY 8/1)  
and rare light-brownish-gray (5YR 6/1), weathers  
light-greenish-gray (5GY 8/1); rare very-fine-  
to fine-grained accessory white mica; firmly  
and  
cemented, calcareous; papery<sup>ly</sup> platy splitting,  
splitting suggests that unit is horizontally  
laminated to thinly laminated; weathers to form  
steep slope. Unit forms conspicuous greenish unit  
on exposure----- 33.6

Section A.--Chavez-Prewitt, McKinley County, N. Mex.--Continued

Chinle Formation--Continued:

Petrified Forest member (lower part):

Feet

7. Clayey siltstone to silty claystone, color bands from 10-40 ft. thick of pale-reddish-brown (10R 5/4) alternate with color bands from 10-40 ft. thick of grayish-red-purple (5RP 4/2) and grayish-red (5R 4/2), weathers same colors; swelling clays; firmly cemented, calcareous clay binding; horizontally bedded in beds from 1-10 ft. thick, one bed about 5 ft. thick contains light-color bands crossing at low angles to bedding suggesting medium-scale low-angle cross strata; weathers to form steep "frothy" surfaced slope. Unit contains several thin-color bands of light-greenish-gray (5GY 8/1) and some of these color bands are horizontally-and ripple-laminated siltstone. From a distance unit forms well-exposed, color-banded unit----- 112.0

Section A.--Chavez-Prewitt, McKinley County, N. Mex.--Continued

Chinle Formation--Continued:

Petrified Forest member (lower part):

Feet

6. Clayey siltstone to silty claystone, grayish-purple (5P 4/2), weathers same color; swelling clays; finely indurated, non-laminous clay binding; structureless; weathers to form "frothy" surfaced badlands. Basal 10 ft. is light-gray (N7) and grayish-purple (5P 4/2); silty, very-fine-grained sandstone containing common fine- to coarse-grained accessory white mica. This silty sandstone weathers as a slope with the rest of the unit. Unit contains several horizons of limestone nodules-----	67.2
Total of Petrified Forest member (lower part)	
(Lower contact uncertain)-----	<u>366.0</u>
Total of Petrified Forest member (lower contact uncertain, thickness composite of sections A and B)-----	<u><u>1,405.7</u></u>

Section A.--Chavez-Prewitt, McKinley County, N. Mex.--Continued

Chinle Formation--Continued:

	<u>Feet</u>
red Lower member (upper contact uncertain): ^	
5. Sandstone (50 percent) and limestone pebble conglomerate (50 percent). Sandstone, very-fine-grained; well sorted; composed of clear quartz, well cemented, calcareous; horizontally laminated to thin bedded; rare low-angle cross strata, one example of contorted laminae noted. Limestone pebble conglomerate, brownish-gray (5YR 4/1), weathers same colors; composed of granules to pebbles as large as 2 in. in maximum diameter of limestone in a limy sand matrix the same as the rest of the unit. Limestone pebble conglomerate is well cemented, structureless, and forms most of upper two-thirds of unit. Unit as whole weathers to form ledge. Lateral to line of section, unit is about twice as thick and is mostly horizontally-laminated and ripple-laminated sandstone-----	5.6

Section A.--Chavez-Prewitt, McKinley County, N. Mex.--Continued

Chinle Formation--Continued:

red  
Lower member (upper contact uncertain)--Continued:

Feet

4. Silty claystone, dark-gray (N3) to light-gray  
(N7), minor grayish-purple (5P 4/2), weathers  
same colors; swelling clay; finely indurated,  
noncalcareous clay binding; structureless;

weathers to form "frothy" surfaced badlands----- 44.8

red

Total of lower member (upper contact uncertain)- 50.4



Section A.--Chavez-Prewitt, McKinley County, N. Mex.--Continued

Chinle Formation--Continued:

Feet

Mottled strata:

3. Sandstone (90 percent) to conglomerate  
(10 percent), white (N9), grayish-purple  
(5P 4/2), and minor very-dark-red-purple  
(5RP 2/2) and dark-yellowish-orange (10YR 6/6),  
colors mottled, weathers same colors. Conglomerate  
confined to basal 2.5 ft. and composed of  
granules to pebbles of yellow and minor gray,  
black, and red chert, rare black quartzite,  
and white quartz. Granules and pebbles average  
from 1/4-1/2 in. in diameter and are as large as  
2-1/2 in. in maximum diameter. A few granules and  
pebbles are scattered in the rest of unit.  
Sandstone and matrix of conglomerate is fine-  
grained with minor fine and medium grains and  
abundant interstitial white silt or clay; poorly  
to fair sorted; composition largely masked; about  
20 percent of grains are black or red; well cemented,  
noncalcareous. Stratification, where visible, is  
thin tabular planar sets of small and rare medium-  
scale low-angle cross laminae. Unit as whole  
weathers to form ledge and locally underlies bench.  
Unit probably correlated with the mottled strata  
at the base of the Chinle at Ft. Wingate----- 19.0  
Total of mottled strata----- 19.0

Section A.--Chavez-Prewitt, McKinley County, N. Mex.--Continued

Chinle Formation--Continued:

	<u>Feet</u>
Total of Chinle Formation (composite of section <sup>S</sup> <sub>A</sub> and B)-----	<u>1,505.8</u>

Unconformity. Basal contact of unit is sharp. Scours as deep  
as 0.5 ft. are present along the contact.

Section A.--Chavez-Prewitt, McKinley County, N. Mex.---Continued

Feet

Moenkopi Formation(?):

2. Siltstone (60 percent) and sandstone (40 percent).

Siltstone, grayish-red (10R 4/2 and minor 5R 4/2), weathers same colors; very-fine-grained sandy in parts; common very-fine-grained white mica; well indurated, noncalcareous; structureless, rare ripple-laminated and horizontally-laminated parts, one thin tabular planar set of medium-scale cross laminae (may be delta foreset). Sandstone, pale-red (5R 6/2 and rare 10R 6/2), weathers same colors and grayish-red (5R 4/2); very-fine-grained, silty in parts; fair to well sorted; composition masked; well cemented, calcareous in parts; horizontally laminated to thin bedded, rare thin trough sets of low-angle, small-scale cross laminae. Sandstone is present as thin to very thick sets and cosets interstratified with siltstone. Unit as whole weathers to form steep slope. Thin bed of grayish-red-purple (5RP 4/2) limestone granule and pebble conglomerate at 4 ft. above base of unit. Unit highly variable in lithology along outcrop. Locally appears to be dominantly siltstone. Within 2 miles of section, Moenkopi locally contains conglomerate beds containing granules and pebbles of quartz, quartzite and chert.

Offset so that overlying units measured 1,000 ft. west of this unit----- 25.8

Total of Moenkopi Formation(?)----- 25.8

Section A.--Chavez-Prewitt, McKinley County, N. Mex.--Continued

Feet

Moenkopi Formation(?)--Continued:

Unconformity. Three-to five-foot-high "folds" at top of San Andres are truncated by overlying beds.

San Andres Formation (unmeasured):

Limestone member (unmeasured):

1. Limestone, moderate orange-pink (10R 7/4) and light-olive-gray (5Y 6/1), weathers light-brownish-gray (5YR 6/1), dense, some parts contain many small pores; well cemented, horizontally thin to thick bedded; weathers to form vertical cliffs along sides of wash ----- Unmeasured  
Base of section; base of exposure. Base of section in wash bottom.

Section B.--Chavez-Prewitt, McKinley County, N. Mex.

Measured by J. H. Stewart and R. F. Wilson. Units 1-10 measured starting at point about 2 miles west of Prewitt and 500 ft. south of U.S. Highway 66 in central part of sec. 11, T. 13 N., R. 12 W., continuing along a N.  $30^{\circ}$  W. line for 2 miles and ending on a prominent point on the cliffs about 1-1/2 miles north of U.S. Highway 66 in east-central part of sec. 34, T. 14 N., R. 12 W.; units 11-20 measured starting at point 2 miles northeast of Chavez in east-central part of sec. 30, T. 14 N., R. 12 W., continuing for 1-1/8 miles northwest, and ending on prominent point about 4 miles east-northeast of Thoreau in southwestern part of sec. 19, T. 14 N., R. 12 W.7

Feet

Top of section, top of accessible exposure.

Top of section is about 500 ft. northeast of tip of promontory developed on Entrada sandstone.

Top of section is N.  $57^{\circ}$  W., of oil refinery near Chavez and Prewitt and N.  $65^{\circ}$  E. of Thoreau-----

Section B.--Chavez-Prewitt, McKinley County, N. Mex.---Continued

Entrada sandstone (incomplete):

Feet

Uppersandy member (unmeasured):

20. Sandstone, light-brown (5YR 6/4), and moderate reddish-orange (10R 6/6), weathers same colors; very-fine-grained, rare disseminated fine- to medium-grains; well sorted; composed of subrounded to rounded reddish-stained quartz and rare black accessory mineral; poorly cemented, calcareous; horizontally laminated in basal 5 ft. and composed of thin to very thick planar sets of medium-to large-scale cross laminae in rest of unit; weathers to form vertical cliff. Basal 2 ft. of unit are yellowish-gray (5Y 8/1) and this lighter color forms continuous color band on the vertical cliff. Only basal 25 ft. of unit examined ----- Unmeasured

Section B.--Chavez-Prewitt, McKinley County, N. Mex.--Continued

Entrada sandstone (incomplete)--Continued:

Feet

Medial silty member:

19. Siltstone (80 percent) to silty sandstone (20 percent), pale-reddish-brown (10R 5/4), abundant light-greenish-gray (5GY 8/1) mottling, weathering same colors and light-brown (5YR 6/4), grades from fine- to medium-grained siltstone to silty, very-fine-grained sandstone, in places sandstone contains a few fine to medium grains disseminated in the siltstone or silty sandstone; well cemented, calcareous; horizontally laminated to thick bedded, stratification has slight waviness; weathers to form vertical cliff continuous with that of overlying unit. Unit forms horizontally stratified and wavy bedded interval at base of cliff developed

on Entrada sandstone-----	44.2
Total of medial silty member-----	<u>44.2</u>
Total of incomplete Entrada sandstone-----	<u><u>44.2</u></u>

Section B.--Chavez-Prewitt, McKinley County, N. Mex.--Continued

Feet

Contact of Entrada sandstone and Wingate sandstone sharp and placed at change from cross-stratified sandstone below to horizontally stratified siltstone above.

Wingate sandstone:

18. Sandstone, light-brown (5YR 6/4) to moderate-reddish-orange (10R 6/6), weathers same colors; fine-grained, minor fine- to medium-grained parts; fair- to well-sorted; composed of subrounded to rounded reddish-stained quartz, rare black accessory minerals and rare white chert(?); poorly cemented, calcareous; horizontally laminated in parts and composed of thick possibly planar sets of low- and high-angle medium-scale cross laminae in other parts; weathers to form steep slope. Sandstone contains common medium- to coarse-rounded to subrounded reddish-stained quartz grains in a finer grained matrix. Basal 10 ft. of unit contains minor amounts of fine to coarse grains, locally very coarse grains to granules of white chert(?) at base. Cross stratified parts of unit are from 3-23 ft., 44-61 ft., and 75-80 ft. Remainder of unit is horizontally laminated or possibly very thick bedded in a few places-----

80.0

Total of Wingate sandstone-----

80.0



Section B.--Chavez-Prewitt, McKinley County, N. Mex.--Continued

	<u>Feet</u>
Contact of Wingate sandstone and Chinle formation sharp and marks change from purplish siltstone below to brownish sandstone above. In places, Wingate sandstone fills clastic dikes extending as much as 5 ft. down into the Chinle formation. These clastic dikes are irregular in shape and some are several feet wide.	
Chinle Formation:	
Owl Rock member:	
17. Siltstone and limestone. Siltstone, pale-red-purple (5RP 6/2) to grayish-red-purple (5RP 4/2), weathers same colors, fine to medium silt; firmly cemented, calcareous; structureless, a few thin horizontal beds. Limestone, same colors as siltstone; dense; well cemented; present as limestone nodules and thin lenses in basal 9 ft. and as thick horizontal bed from 4.1-7.1 ft. Thick bed of limestone contains abundant small masses of chert. Unit as whole weathers to form steep slope with persistent ledge developed on the limestone bed. Limestone bed forms conspicuous thin purplish band along exposure. Most of unit probably does not contain swelling clays; locally, however, swelling clays may be present-----	30.7
Total of Owl Rock member-----	30.7

ection B.--Chavez-Prewitt, McKinley County, N. Mex.--Continued

hinle Formation--Continued:

Feet

Petrified Forest member (upper part):

16. Siltstone (80 percent) to silty claystone (20 percent),  
pale-reddish-brown (10R 5/4), rare-grayish-red  
(5R 4/2), weathers same colors, probably swelling  
clays; firmly to well cemented, calcareous;  
dominantly structureless, minor horizontally  
laminated parts; weathers to form steep slope. Some  
of unit weathers with a "frothy" surface----- 103.8
15. Limestone and siltstone. Limestone, light-gray (N7),  
weathering dark yellowish-orange (10YR 6/6); dense;  
well cemented; present as two thin horizontal beds  
separated by 0.3 in. thick horizontal bed of siltstone.  
Siltstone, light-gray (N7), weathers same color,  
firmly cemented, calcareous. Unit as whole weathers  
to form small ledge. Unit persistent along exposure  
and marks change from purplish rocks below to reddish  
rocks above----- 1.3

Shale Formation--Continued:

Petrified Forest member (upper part):

Feet

14. Silty claystone and minor clayey siltstone and siltstone, very-light-gray (N3) in basal 10 ft. and grayish-red (5R 4/2), pale-red (5R 6/2), and minor grayish-red-purple (5RP 4/2) in rest of unit, weathers same colors; swelling clays, firmly to well cemented, calcareous; structureless; weathers to form steep "frothy" surfaced slope. From a distance unit appears as purplish interval between reddish rocks above and below----- 55.8
13. Siltstone to silty sandstone, and limestone pebble conglomerate. Siltstone to silty sandstone, pale-reddish-brown (10R 5/4) and pale-red (10R 6/2 and 5R 6/2), weathers same colors, grades from medium siltstone to silty, very-fine-grained sandstone. Sandstone is fair sorted and composed of subangular grains (composition of grains is masked). Siltstone to silty sandstone contains common medium-grained accessory white mica; firmly to well cemented, calcareous; horizontally laminated, some medium-scale cross strata on nearby exposures and possibly along line of section. Limestone pebble conglomerate, grayish-red-purple (5RP 4/2), weathers same color, composed of coarse grains to cobbles of limestone or

Section B.--Chavez-Prewitt, McKinley County, N. Mex.--Continued

Shale Formation--Continued:

Petrified Forest member (upper part):

Feet

13.--Continued

limy siltstone in a limy silty or clay matrix; poorly cemented; structureless, possibly some very thin

horizontal beds. Limestone pebble conglomerate is

present as a 3-ft. bed at base of unit and as 2-ft.

bed at top of unit. Basal bed is mostly composed of

coarse grains to granules and minor pebbles. Top bed

is composed mainly of granules and pebbles. Top bed

contains cobbles as large as 6 in. in maximum diameter.

Unit as whole weathers to form steep slope. Locally top

limestone pebble conglomerate forms ledge. Position and

amount of limestone pebble conglomerate in unit <sup>are</sup> highly

variable along exposure----- 23.0

Section E.--Chavez-Prewitt, McKinley County, N. Mex.--Continued

Chinle Formation--Continued:

Petrified Forest member (upper part):

Feet

- |  |      |
|--|------|
| 12. Siltstone to silty claystone, pale-reddish-brown<br>(10R 5/4), minor grayish-red (10R 4/2 and 5R 4/2),<br>and rare pale-red (10R 6/2), weathers same colors;<br>silt fraction is fine to medium silt, clay fraction<br>is composed of swelling clay; firmly to well cemented,<br>calcareous; structureless; weathers to form "frothy"<br>surfaced badlands. Contains many horizons and thin<br>intervals of limestone nodules----- | 69.7 |
| 11. Covered, forms 3/4-mile-wide flat with minor hills<br>and knolls-----  | 92.1 |

Long offset in section so that overlying units measured about  
2-1/2 miles, N. 65° W. of underlying units.

Section B.--Chaves-Prewitt, McKinley County, N. Mex.--Continued

Chinle Formation--Continued:

Petrified Forest member (upper part):

Feet

10. Sandstone, pale-red-purple (5RP 6/2) and minor light-greenish-gray (5GY 8/1), weathers pale-red (5R 6/2) and pale-brown (5YR 5/2); very-fine- to fine-grained; fair sorted; composed of subangular milky quartz(?) and 20 percent dark-gray and rare orange grains; firmly to well cemented, calcareous; composed of thin to thick tabular planar sets of small-to medium-scale cross laminae; weathers to form prominent vertical cliff and underlies bench. Unit is most prominent cliff and bench-forming unit in the Chinle formation above the Sonsela sandstone bed. Basal 3.3 ft. of unit are limestone pebble conglomerate. Limestone pebble conglomerate, light-greenish-gray (5GY 8/1), composed of rounded coarse grains to pebbles as large as 2 in. in maximum diameter of gray limestone, limy silt matrix; finally to well cemented; very-low-angle cross strata; intertongues with rest of unit. Thickness of unit appears to be maximum for local area. Units 6-10 measured up prominent point N. 50° W. of Prewitt----- 39.2

Section B.--Chavez-Prewitt, McKinley County, N. Mex.--Continued

Chinle Formation--Continued:

Petrified Forest member (upper part):

	<u>Feet</u>
9. Sandstone, pale-red-purple ( <u>5RP</u> 6/2) minor light-greenish-gray ( <u>5GY</u> 8/1) mottling, weathers same colors, very-fine-grained; well sorted; composition mostly masked, 10 percent of rock is orange or black grains, common coarse-grained accessory white and dark mica; well indurated, noncalcareous; horizontally laminated and minor thin shallow trough sets of very low-angle, small- to medium-scale cross laminae; weathers to form ledgy slope-----	21.8
8. Siltstone (70 percent), silty sandstone (20 percent) and silty claystone (10 percent), all lithologies intergrading, pale-reddish-brown ( <u>1OR</u> 5/4) and minor pale-red ( <u>1OR</u> 6/2), weathers same colors; silty sandstone is similar to that in unit 6, swelling clays in both the siltstone and silty claystone; firmly to well indurated, noncalcareous; mostly structureless, a few thin sets of horizontal laminae, many horizontal stratification planes; weathers to form steep slope, locally slope weathers with a "frothy" surface. A few thin lenses of limestone grain sandstone similar to that in unit 6 except that some is light-greenish-gray ( <u>5GY</u> 8/1)-----	108.6

Shale Formation--Continued:

Petrified Forest member (upper part):

Feet

7. Silty sandstone to sandy siltstone, pale-red (10R 6/2 and 5R 6/2), weathers same colors, grades from silty, very-fine-grained sandstone to very-fine-grained sandy siltstone, rare coarse-grained accessory white mica; well indurated, noncalcareous; horizontally laminated and minor thin to very thin shallow trough sets of very-low-angle, small-scale cross laminae; weathers to form ledge. Locally along exposure ledges similar to lithology to this one are found in the underlying unit and as high as 15 ft. up in the overlying unit----- 13.0
6. Siltstone to silty sandstone, pale-red (10R 6/2) and pale-reddish-brown (10R 5/4), weathers same colors; grades from siltstone to silty, fine-grained sandstone, all gradations of lithology, probably 60 percent of unit is silty sandstone, 30 percent sandy siltstone and 10 percent siltstone, composition masked; firmly to well cemented, noncalcareous to slightly calcareous; structureless (40 percent), horizontally laminated (30 percent), and medium- to large-scale, very-low-angle cross strata (30 percent). Cross strata are in sets from a few feet to 20 ft. thick. Probably both shallow trough sets and tabular planar sets are present. Unit



Section E.--Chaves-Prewitt, McKinley County, N. Mex.--Continued

Chinle Formation--Continued:

Fossiliferous Forest member (upper part):

	<u>Feet</u>
6.--Continued.	
as whole weathers to form steep slope. About 5 percent of unit is pale-red (10R 6/2) limestone grain sandstone. The limestone grain sandstone is coarse- to very-coarse grained and locally grades to limestone granule conglomerate. The limestone grain sandstone and limestone granule conglomerate occur as thin to thick lenses interstratified with the rest of the unit-----	78.4
5. Covered, weathers to form mile-wide flat. Measured along a N. 30° W. line-----	308.0

Station B.--Chavez-Prairie, McKinley County, N. Mex.--Continued

Grille Formation-- Continued :

Petrified Forest member (upper part):

Feet

4. Sandstone (70 percent) and siltstone (30 percent).

Sandstone, pale-red-purple (5RP 6/2), weathers same color, very-fine-grained; well sorted; composition mostly masked, about 20 percent of grains are either dark-gray or orange; well cemented, slightly calcareous; composed of thin trough sets of very-low-angle small- to medium-scale cross laminae, minor horizontal laminae.

Siltstone, grayish-red (10R 4/2), weathers same color, about 20 percent of rock is coarse grains to granules of light-gray siltstone; poorly cemented, calcareous; structureless; present as thin to thick lenses interstratified with thin to thick sets or cosets of sandstone. Unit as whole weathers to form small irregular ledge and underlies bench-----

8.0t

Section B.--Chavez-Prewitt, McKinley County, N. M.--Continued

Chinle Formation--continued

Petrified Forest member (upper part):

Feet

3. Clayey siltstone to sandy siltstone, grayish-red  
(5R 4/2) and minor grayish-purple (5P 4/2), common  
light-greenish-gray (5GY 8/1) mottling, weathers  
same color; very-fine-grained sandy in part;  
probably swelling clays; firmly cemented, calcareous;  
structureless; exposed in road cut----- 16.6
2. Covered, weathers to form flat between Sonsela sandstone  
bed and exposure in road cut----- 11.2
- Total of upper part of Petrified Forest member----- 955.7

Sonsela sandstone bed (unmeasured):

1. Sandstone, same as that in unit 14, Chavez-Prewitt  
section A. Contains a few scattered granules and  
pebbles of chert, quartzite and quartz; stratification  
is not distinct but appears to be mostly low-angle  
medium-scale cross laminae. Only 10 ft. of unit  
exposed. Weathers to form lowest part of dip slope  
developed on Sonsela sandstone bed. Observation  
suggests that the incomplete thickness of the  
Sonsela in Chavez-Prewitt section A is within  
50 ft. of being the complete thickness ----- Unmeasured
- Base of section; base of exposure. Base of section  
about 500 ft. south of U.S. Highway 66 and about  
2 miles west of Prewitt.